General Conservation Survey
Carter County Museum
Ekalaka, Montana

October 3-4, 2019

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General Conservation Survey  
Carter County Museum  
Ekalaka, Montana

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General Conservation Survey
Carter County Museum
Ekalaka, Montana

Introductory Summary

This report is an affirmation of the actions being taken, and the strategic planning of the Carter County Museum. The staff at the Carter County Museum (CCM) are of the highest professional standard. The board and community are extremely active and support the move towards accreditation and the building of a new museum that would feature the paleontology collection. The professionalism of the staff, board and community support, and the collections make the Carter County Museum an excellent candidate for accreditation. The major issue with the CCM is the dichotomy between its collections. The CCM has well-deserved status as a local museum with a charming building and interesting collection that also contains an internationally renowned fossil collection and paleontology program. The new museum will resolve this issue by providing a modern museum building to highlight the paleontology programing and collection.
This report is the result of an IMLS Conservation Assessment Program (CAP) general conservation consultation visit to the Carter County Museum, Ekalaka, Montana. A site visit was carried out by Beverly Perkins, Collections Assessor and Jerry Berggren, AIA, Buildings Assessor on October 3 & 4, 2019. The survey was completed at the request of, and with the invaluable assistance from Executive Director Sabre Moore and Marketing & Communications Coordinator, Taxidermist Jennifer Hall. The CAP survey was supported by President/Chair of the CCM Board of Directors Llane Carroll and Secretary/Treasurer Marlene Waterland, along with the CCM Board of Directors and Members.

This CAP assessment is taking place at a key time in the history of the Carter County Museum. A very talented team of emerging professionals has taken over the main staff positions at the Museum. They are advancing the collections care, programming, and communications, making huge strides in professionalism. The current Executive Board, and Trustees, the town of Ekalaka, Carter County, and Montana see the Museum as a valuable resource, and support the staff. An important addition to the museum building is already in the planning stages.

The purpose of the consultation is to investigate the overall state of the Carter County Museum collections and buildings to identify problem areas and make recommendations for improvement. The results of the consultation will be used to establish priorities, both short-range and long-term, and reinforce subsequent funding proposals for implementation of needed programs.

This report outlines conditions observed, with a discussion of recommended actions, and organizes them under a series of subheadings. In the concluding section of the report, Recommendations, these suggestions are organized as short- intermediate- or long-term actions, to facilitate institutional planning.
The Carter County Museum
“90 Million Years of Comprehensive History”
-Executive Director Sabre Moore

“The Carter County Museum is a 501(c)3 nonprofit organization located centrally on the Main Street of Ekalaka, Montana, a ranching community with a population of 331. Founded in 1936 by amateur archaeologists and paleontologists of the Carter County Geological Society, the museum’s original mission was related to the collection and study of dinosaur fossils found on local ranches. The museum has the proud distinction of being Montana’s first county museum as well as the state’s first dinosaur museum. The CCM is one of fourteen museums on the Montana Dinosaur Trail, a passport-style tour of Montana’s dinosaur-bearing institutions.” -CCM Website

Mission Statement
The Carter County Museum is dedicated to inspiring, educating and enriching the life of the public by deepening the understanding and appreciation of history, art and science through the collection, research, preservation and exhibition of fossils, archaeological and cultural material, and the acquisition of a reference library with a focus on southeastern Montana and the surrounding region.
The Carter County Museum is an outstanding example of what happens when a great collection, professional staff, and local support come together.

CCM is located in a wonderfully isolated part of Montana. The area surrounding Ekalaka (population 331) is beautiful, rolling ranch land and magical Medicine Rocks State Park. However, Ekalaka is located 36 miles from the nearest town, Baker MT (population 1,935) and another 80 miles to Miles City, MT (population 8,400). In spite of its location, over 5,000 people attended the museum in 2018. That is an 18% growth of visitors from the preceding year. CCM is open seven days a week year-round and attracts scholars, students of history and paleontology, locals, tourists, hunters, and pipeline workers. This visitation will increase further when CCM also serves as the visitor center for Medicine Rocks State Park (visitation 19,000). Visitation to CCM and Medicine Rocks State Park will increase again with the establishment of the park as a Dark Sky Sanctuary.

The increase in visitation to CCM is staggering when considered in relation to the notable scarcity of housing for tourists, volunteers, and interns.

The Carter County Geological Society owns the collections and the inventory in the museum store. The county owns and maintains the buildings and the grounds and provides a field vehicle for the CCM. CCM collections are held in the Museum building, The Schoolhouse, The Cabin, and three offsite storage units (Storage Building One, the new Storage Building Two, and Storage Building Three).

The CCM was the first museum to display dinosaurs in Montana. The collections include one of the four largest Hadrosauridae duck-billed Dinosaurs on exhibit in the world, a Triceretops from the local Hell Creek, the Mammoth from Powder River that was featured in “USA Today” and many, many more unique and valuable fossils. CCM is now an official Non-Department of Interior Repository for BLM Fossils.

The Carter County Museum is one of the biggest tourist draws in the county. The CCM has served to unify the north and south regions of the county. During our visit to Ekalaka we spoke with the owners of the motel, the café, and the coffee shop. Some quotes from these business owners include: “The Museum runs the town”, “[The Museum is] the heart of the town”, [The Museum] keeps the town alive”, and “It brings in tourists.” When the coffee shop owner was asked if the Museum was important to the community, she replied, “Oh my God!!”

The story of the founding of the Museum is an excellent forecaster of the current state of the Museum and its community today. The local ranchers and landholders were finding important fossils and paleo tools on their properties. Instead of keeping the finds, or selling them, the landowners decided to establish a museum so that their treasures could be shared with the world. The local ranchers donated the petrified wood used to build the building.
The 1954 “Life Magazine” was dedicated to the story of the local community and their role in sharing their world-renown fossil finds. The article illustrates the diligence of the ranchers in preserving and processing the finds.

Today local ranchers support and work with the Carter County Museum. They notify the Museum staff of important finds on their property and allow access to dig sites that are surrounded by private ranches. The landowners work with CCM to provide sites for Shindig public workshops involving fossil digs. CCM hosts an annual Founders Day during which family members from near and far gather to celebrate their ranches and families.

The local community continues to give important, valuable collections to the Museum.

Examples of important collections in the CCM found in Carter County

COMMUNITIES
The people of Ekalaka and Carter County support the Carter County Museum by serving on the board and as members, donating funds, and volunteering. CCM boasts over 40 volunteers.

Executive Board and Member Meeting
The Executive Board and museum director meet quarterly with Carter County commissioners. Carter County is very supportive of CCM, recognizing the large roll the CCM plays in visitation and revenue in the county (economic impact of the Museum $128,160 in 2017).

The President/Chair of the board Llane Carroll discovered the important “pinto” plesiosaur that is actively being processed by the CCM. His wife, Sharon Carroll is a member of the teacher advisory committee, native species garden volunteer, and Shindig site coordinator. Secretary/Treasurer Marlene Waterland is a rancher known as “The Hurricane.” She not only serves on the board, takes care of gardens on the grounds, repoints exterior cement, but also builds wood storage shelves, stages, and anything else the Museum needs.

The Carter County Museum engages scholars from all over the United States and the world. The programming, collections, and associated fossil digs attract world-renown paleontology scholars. A short list is provided below.

INTERNATIONAL SCHOLARS ASSOCIATED WITH CCM

Dr. Kirk Johnson, Sant Director, Smithsonian’s National Museum of Natural History  
Dr. Mark Goodwin, Assistant Director Emeritus, University of California Museum of Paleontology  
Rebecca Hunt-Foster, Monument Paleontologist and Museum Curator, Dinosaur National Monument  
Dr. Alida M. Bailleul, Postdoctoral Research Fellow, Institute of Vertebrate Paleontology and Paleoanthropology  
Dr. Robin O'Keefe, Marshall University  
Thomas Holtz, Principal Lecturer in Vertebrate Paleontology at the Dept. of Geology, University of Maryland  
Dr. John Scannella, John R. Horner Curator of Paleontology, Museum of the Rockies  
Dr. David Evans, Temetry Chair in Vertebrate Paleontology, Royal Ontario Museum  
Eric Scott, Principal Paleontologist for Cogstone Resource Management Inc.  
Dr. Thomas Carr, Associate Professor of Biology, Carthage College  
Christian Heck, PhD Candidate in Biomedical Sciences, Oklahoma State University  
Cary Woodruff, PhD Candidate, University of Toronto  
Elliot Armour Smith, BLM Intern & Master of Science, Marshall University  
Dr. Dana Rashid, Research Professor in Cell Biology & Neuroscience, Montana State University  
Dr. Eugenia Gold, Assistant Professor in the Biology Department, Suffolk University  
Dr. Julia McHugh, Curator of Paleontology, Museums of Western Colorado  
Dr. Holly Woodward Ballard, Assistant Professor, Oklahoma State University for Health Sciences  
Dr. Matt Lamanna, Curator, Carnegie Museum of Natural History  
Dr. Victoria Arbour, NSERC Postdoctoral Fellow, Royal Ontario Museum and University of Toronto
Senior Professor, Institute of Vertebrate Paleontology and Paleoanthropology, Chinese Academy of Sciences
Stewart Cook, Paleontology Intern Lab Manager, B.S. Earth Sciences/Paleontology student Montana State University
Elliott Smith, BLM Intern preparation of plesiosaur fossil, M.S. Earth Sciences/Paleontology student Marshall State University, West Virginia
Steve Hobe Museum Educator, Adler Planetarium
Henry Ballard, Volunteer, Smithsonian National Museum of Natural History rehousing volunteer, FBI bomb technician
Zakaria Hannebaum, Volunteer, volunteer at the Oklahoma State university paleontology lab under Dr. Holly Woodward Ballard, B.S. student Earth Sciences/Paleontology Montana State University
Natalie Delaney-John, Owner of Rest in Pieces Taxidermy, Melbourne Australia
Gerard Geer, Teacher at Rest in Pieces, Melbourne Australia
Field crew students from Virginia, Montana, Colorado, Georgia

FUNDING RESOURCES

The Carter County Museum is supported by many sources. The town, county, and private citizens all combine to ensure the success of the CCM. The staff is very successful at obtaining grant funding.

In 2013, the museum began hosting the Annual Dino Shindig, an event that invites scientists to speak to the local community and visitors about their work in the area. The dinosaur festivities culminate with a street dance and expedition into the Hell Creek Fossil Formation in which families and amateur fossil enthusiasts can gain real-world
experience in field paleontology. The Dino Shindig was named Montana’s Event of the Year by the Office of Tourism and Business Development in 2017. It is the primary driver of tourism to the area in July and an economic boon to businesses in the community. The Dino Shindig brings funds into the Museum in the form of registration fees, food sales, and museum store sales.

The Museum Store brought in $52,000 (gross) in 2018. That averages out to $9 spent in the store by each visitor. This is amazing! Some of the popular items include Jen Hall’s delightful designs that are put onto posters, T-shirts, cards, etc.

The CCM has a development program that involves the sale of wood plaques made with ranch names and brands. Board Member Marlene makes the plaques. The donation to the CCM is $300. Many families coming to Founders Day request plaques for their family ranches.
NEW MUSEUM

CURRENT EXHIBITION EXAMPLES

The Carter County Museum is planning on expanding with the addition of a new museum building connected to the current museum building. CCM has an expansion project document, *Keep Collections Local Expansion Project*, that breaks down the expansion by exhibitions, lab space, Medicine Rocks State Park Visitor Center, community space, collections storage, museum store, and costs associated with each area and the overall project.

Planning for the project and fundraising is underway. The new museum would alleviate issues listed below.
- The need to provide a modern building and exhibition space worthy of the internationally renowned Paleontology collection
- The need for safe and purpose-built workspace for old paleo collections and incoming, wet paleo finds
  - The need for a “dirty” room away from collections storage
  - The need for an extraction system large enough to work on large fossils
- The need for museum quality storage furniture and materials for paleo collections
The need for work and office space for staff, seasonal and part-time staff, fellows, and interns, and volunteers. This massive project will require fundraising as well as:

- Planning for moving and installing the Paleontology collections in the new building
- Planning for moving and installing the Non-Paleontology collections within the current building
- Preparation of the collections for the move of Paleontology to the new building
- Preparation of the Non-Paleontology collections for the move within the current building
  - Adapting space in the current building for exhibition and storage of Non-Paleontology collections
- Hiring staff for the collection moves
- Preparing the new building for collections coming into new exhibitions and storage
  - Designing and creating new exhibition mounts, didactics, graphics, etc.
  - Preparing new storage cabinetry with materials such as Ethafoam, etc.
    - Moving and tracking the collections

DINOSAUR MOUNT CRAMMED INTO SMALL SPACE
PROGRAMS AND OUTREACH

Reaching for the Stars

The programming and outreach accomplished by the staff at the Carter County Museum is phenomenal! The core staff consists of one full-time, year-round professional director and three part-time year-round staff. The programming covers; taxidermy, paleontology, museology, history, volunteerism, education, and more. The programming is expanding to include the universe with the creation of the collaboration with Medicine Rocks State Park and the Montana Chapter of the International Dark Sky Association.

Last year, the CCM served 14,925 people throughout the world through educational programming, outreach activities, and in-person visits at the museum. The CCM provides educational and training opportunities to the school children of Ekalaka, PhD students in Montana and other states, tourists, and the most renown Paleontology scholars in the field.

What is really impressive about the staff, interns, and volunteers of CCM is that they not only research the best way to carry out a project, seek funding, and carry out the project, they also share their knowledge through papers, presentations, and workshops.

The following are a selection of some of these programs:

The Annual Dino Shindig attracts major scholars in the field of paleontology. These scholars present papers and have a chance to network and share during their time in Ekalaka. Participants in the Shindig have the opportunity to listen to these scholars and participate in fossil discovery.

During the field season, local and international crews work on fossil sites to uncover, document, jacket, and process the rich paleontology sites in the area. Last year an Australian crew and local members of the CCM field crew excavated a plesiosaur and continued prepping a mammoth.

An initiative led by Henry Ballard, rehousing teacher and field crew volunteer included rehousing large fossils in new clamshell techniques and small finds in intricately engineered and fabricated storage trays. As part of this project CCM held workshops on new fossil housing techniques.
The Amber Citizen Science Project led by Stewart Cook continues to find insects and plant matter in 65 million-year-old tree resin. Many volunteers, interns, and local high school students are involved in sorting the amber specimens, examining the amber for insects, and graphing those finds. The amber project currently uses two fairly low power microscopes in house and then sends the samples off for further study under higher magnification. The Carter County Museum would greatly benefit from having a better microscope for use by scientists and for teaching.

The Carter County Museum has initiated a 3D printing project. This is an important project for a museum holding such important fossils. The project includes recycling plastic bottles into models with the project slogan, “Make your trash into dinosaur bones.” One critical element is missing from this project. The CCM critically needs a 3D scanner.

Jenn Hall, Taxidermist has been refreshing the old taxidermy in the collection as well as making new taxidermy specimens. She trained an undergraduate student, summer intern and works with locals on personal projects.
CCM AFFILIATIONS

Education/Research

- Museum of the Rockies (joint educational curriculums, MAIA educational trunk, StarLab Rural pilot program, Paleontology research collaborations)
- Kumamoto Montana Natural Science Museum Association (joint educational curriculum)
- Project Archaeology (Medicine Rocks State Park Rock Art curriculum)
- ZooMontana (planned educational trunk)
- Custer Gallatin National Forest (Star Parties)
- Marshall University (Dr. Robin O'Keefe & student research on our plesiosaur specimen)
- National History Museum of Los Angeles County (CCM Adjunct Curator of Paleontology Nathan Carroll)

Sister Museums
- Museum of the Rockies (2013)
- ZooMontana (expected 2020)
- Goshoura Cretaceous Museum (expected 2021)

State Associations (active membership or direct collaborative partner)
- Montana Dinosaur Trail
  - CCM Marketing & Communications Coordinator Jenn Hall is working on rebranding trail advertising/marketing materials (posters, passport, apparel)
- Montana Fish, Wildlife and Parks
  - CCM will soon be the official Visitor Center for Medicine Rocks State Park. At present, CCM is a collaborative partner on educational programming, star parties, Dino Shindig lectures in the park, and the nominating partner for the park to become an International Dark-Sky Association Sanctuary)
- Museums Association of Montana
- Visit Southeast Montana
- Montana Memory Project
- Montana Outdoor Heritage Project
- Montana Nonprofit Association
- International Dark-Sky Association - Montana Chapter

National Associations
- Bureau of Land Management Non-DOI (Department of Interior) Repository for BLM Fossils
- American Alliance of Museums
- Custer Gallatin National Forest Service
- Society of Vertebrate Paleontology
- NASA Museum Affiliate
POLICIES

Sabre Moore, Executive Director has done an incredible job of setting policies and practices to ensure the safety of the collection. Policies include: Disaster Plan, Institutional Code of Ethics, Collections Management Policy, Volunteer Policy, Fossil Preparation Lab Manual, Amber Citizen Science Project Manual, and IPM Guidelines.

NAGPRA issues have been addressed.

The security camera program is under review with recommended upgrades coming as a result.

Collections policies have been established to ensure the proper tracking of collections. Rules are in place to prohibit gifting or loaning of collections without approval. Collections are processed swiftly and efficiently.

Fossil Samples given away in the distant past, retrieved by collegial networking.
STAFF

The staff of the Carter County Museum are its second best resource, running a very close second to the fantastic collection. It seems that they can, and will do anything and everything to elevate the CCM. One of their catchphrases is, “If we don’t know how to do it, we go back to school!” As the townspeople put it, “Those kids have done wonders with [the Museum].” We have included some CV highlights from the three major staff members for your amazement.

Executive Director: Sabre Addington Moore

Education:
M. A. Museum Studies, M. A. Certificate Nonprofit Management August 2016 JOHNS HOPKINS UNIVERSITY Baltimore, MD • Course work focused on global perspectives on museums, project management, exhibition design, resource development in nonprofits, collections management, business and project management, educational programming and nonprofit governance

Summa Cum Laude, GPA 4.0 on a 4.0 scale B. A. History May 2013
MONTANA STATE UNIVERSITY Bozeman, MT • Honors Thesis Project: “Journal of a Cruise on the USS Constitution” • Minors in Native American Studies, Museum Studies, and English Literature • Summa Cum Laude, Cumulative GPA 4.0, Honors college degree

Professional Experience:
Carter County Museum (CCM) Ekalaka, MT

Executive Director December 2016 to present
Development Director Sept. 2015 to Nov. 2017
Exhibit Designer, Chair of Archaeology Dec. 2012 to Nov. 2017
Identified and developed collaborative partnerships for joint educational projects with Carter County Public Schools, Museum of the Rockies and Montana State Parks Department, Montana Kumamoto Natural Science Museum Association • Established and developed collaborative partnerships between Carter County Museum and Montana State Parks Department, Bureau of Land Management, Montana Dinosaur Trail, Visit Southeast Montana, Montana Association of Museums, Custer Gallatin National Forest Service, International Dark Sky Association - Montana Chapter, Montana Outdoor Heritage Project, Montana Memory Project, Montana Fish Wildlife and Parks, Smithsonian National Museum of Natural History (rehousing), Denver Museum of Nature and Science, ZooMontana, Marshall University, Johns Hopkins University Museum Studies Department, Montana State University Museum Studies Department, NASA Museum Affiliation Program, Eastern Montana Museums Association • Increased annual attendance to museum by 35 percent, educational programming by 161 percent and outreach by 120 percent. • Created museum policies including Disaster Plan, Institutional Code of Ethics, Collections Management Policy and Volunteer Policy, project coordinator for participation in MAP and CAP programs • Awarded Event of the Year from Montana Office of Tourism and Business Development for the annual Dino
Shindig (2017) • Designed exhibit content, script and managed permanent exhibit on American Indian Collections, designed exhibit content for dinosaur hall

CERTIFIED INTERPRETIVE GUIDE April 2019 National Association for Interpretation SITE

STEWARD July 2018 to present Project Archaeology, Medicine Rocks State Park, Bureau of Land Management Ekalaka,

MONTANA PUBLIC EDUCATION October 2016 to January 2017 Museum of the Rockies (MOR) Bozeman,

Professional Leadership:
FOUNDING BOARD MEMBER March 2019 to present International Dark Sky Association - Montana Chapter Representing Southeast
MT AMBASSADOR Montana Outdoor Heritage Project February 2019 to present
AMBASSADOR June 2018 to present Montana Memory Project Representing Carter County SECRETARY/TREASURER, BOARD OF DIRECTORS June 2017 to present Visit Southeast Montana Representing Carter County, Marketing Committee Chair MEMBER, BOARD OF DIRECTORS March 2017 to present Museum Association of Montana Small Museums Chair PRESIDENT, BOARD OF DIRECTORS February 2017 to present Camp Needmore Ekalaka, MT

Professional Certificates:


**Grants/Sponsorships:** • Montana History Foundation Feek’s Vision/Tooke Bucking Horses Sponsorship ($1,000) • Red Ants Pants Foundation 3D Printer Recycling Program Grant ($1,700) • Montana History Foundation Helping Hands Rehousing Workshop Sponsorship ($1,235) • Montana State Libraries ($1,640) • Collections Assessment Program ($7,800) • Montana History Foundation Project Archaeology Curriculum Grant ($2,100) • Bureau of Land Management Fossil Day Activity Grant ($1,500) • Montana Office of Tourism and Business Development Grant Montana Dinosaur Trail Poster Series ($4,320) • Montana History Foundation Collections Rehousing Grant ($5,000) • Jerry Metcalfe Foundation archive preservation grant ($2,000) • Red Ants Pants Foundation Hell Creek Citizen Science Project Grant ($4,300)

**Marketing & Communications Coordinator, Taxidermist: Jenn Hall**

**Education:**
2015 - 2019
Johns Hopkins University
4.0 GPA
MA | Museum Studies
University of Westminster Seminar Abroad Student

2005 - 2010
University of Pennsylvania
*summa cum laude*
Philadelphia, PA
BFA | Printmaking
Minor | Geology

2004 - 2008
Pennsylvania Academy of the Fine Arts
Travel Scholar
Philadelphia, PA
Certificate | Printmaking
Work Experience
2016-Present | Marketing and Communications Coordinator
Carter County Museum
Ekalaka, MT
Organize & promote the museum's Annual Dino Shindig event; Create outreach strategies that promote the museum's mission to act as a resource to both disparate local and scientific communities; Design promotional material and exhibits to generate revenue and interest in the museum's collections.

Commercial Taxidermist
Holding commercial taxidermy license and long-term federal permit from Fish & Game for work on migratory birds for CCM exclusively.

2015 | Museum Illustrator
Gallagher & Associates
For the Santa Barbara Museum of Natural History, Santa Barbara, CA
Was the primary illustrator for Mammal Hall renovation project, creating illustrations of over 20 species in naturalist notebook style for taxidermy diorama signage.

2014-2016 | Taxidermist and Studio Manager
Prey Taxidermy
Los Angeles, CA
Taught museum-standard taxidermy techniques, working on private commissions, and studying historical mounts at the Los Angeles Natural History Museum and Occidental College’s Ornithology Dept. and repair as part of graduate work.

2014 | Scientific Illustrator
Drexel University
Philadelphia, PA
Illustrated Dreadnoughtus schrani for publication and release of paper in the journal of Science.

2014 | Artist in Residence and Field Technician
Carter County Museum
Ekalaka, Montana
Designed, fabricated and sculpted 12-foot azadarchid skeletal mount for a new pterosaur display. Designed Graphics for promotional materials. Excavated new specimens, took soil samples, and was a field leader for the museum's annual Dino Shindig.

2014 | Scientific Illustrator
Walters and Kissinger, LLC
For the Marco Island Historical Society
Illustrated the extinct species tapirus veroensis and Palaeolama mirifica for a museum mural.
2013-2014 | Art and Science Teacher
The Wagner Free Institute of Science
Philadelphia, PA
Taught art and science for middle school students, focusing on scientific and paleontological illustration as part of the Wagner's SNAP (Science, Nature, and Art in Philadelphia) program.

Grants
2019 | Montana Office of Tourism & Business Development DOC Tourism Grant ($3,600)
Visit Southeast Montana Cooperative Marketing Grant ($700)
2018 | Montana Office of Tourism & Business Development Dinosaur Trail Poster Grant

Adjunct Curator: Nathan Carroll

Education:
PhD  University of Southern California
   Earth Sciences, expected graduation Dec 2019
   Natural History Museum of Los Angeles County, Dinosaur Institute
   Research Associate
MS  Montana State University
   Earth Sciences, May 2012-2014
BS  Montana State University
   Earth Sciences, Honors, magna cum laude 2012

Teaching Experience:
University of Southern California
   Teaching Assistant – Earth History, Earth Evolution 2014-2018
   Collaborated on curriculum and exam development, met with students upon request, and graded all written work, including final exam papers.
Montana State University
   Teaching Assistant – Comparative Vertebrate Anatomy, Dinosaur Paleontology, Geomorphology 2012-2014

Related Experience:
Carter County Geological Society, Carter County Museum
   Curator of Paleontology 2012 – Current
   Paleontology collections management, research facilitation between academic institutions and local partners, exhibit content and design, public programing, strategic planning
   Dinosaur Institute, Natural History Museum of Los Angeles County
Field Assistant, Research Associate 2008, 2012 – Current
Field survey and excavation work, road and trail development, local liaison (2008).
Museum of the Rockies

Field Assistant, Lab Assistant 2010-2013
Field survey and excavation work, quarry mapping and oversight, volunteer crew management. Laboratory fossil preparation, specimen identification and accessioning, molding and casting.

Publications and Papers:

Carroll, N.R., Chiappe, L.M., Bottjer, D.J. (In Review). Mid-Cretaceous amber inclusions reveal morphogenesis of extinct rachis-dominated feathers. Scientific Reports (Nature Publisher Group)


PUBLISHED ABSTRACTS


WORK SPACE

There is inadequate space for such a dynamic museum. The staff office area is old, cramped, and does not provide privacy. Office space for the many, many other project managers, interns, volunteers, etc. is combined with collections and project work areas and is shared and cramped. Work spaces include dirty and wet activities with the storage of delicate collections.

Wholly inadequate office space for professional staff

Ten, or more people share this office/project space. At times there is office work, collection rehousing, taxidermy, 3D printing, and amber examination taking place in this cramped, yet clean and organized area.
ONE OF THE FINEST PALEONTOLOGY COLLECTIONS AND PROGRAMS IN THE WORLD
EXAMPLES OF THE RICH NON-PALEONTOLOGY COLLECTIONS:
History, Ethnography, Local Innovation, Heroes, Contemporary Art, Ranching, Military, Photography, and so much more!
Carter County Museum collections are a successful mix of paleontology, history, taxidermy, ethnography, minerals, military and more. Unfortunately, all the collections suffer from being cramped into an old building that has a very strong character of its own. The building IS a collection object. The world-class paleontology collection does not have the physical space to shine. This collection deserves a purpose-built space for expanded exhibits. The paleontology collection is extremely dynamic and constantly expanding with very large objects. It doesn’t have enough room for exhibits or storage today and is sure to expand tomorrow (literally!).

The exhibits cover a comprehensive 90-million-year history of the region, from fossil dinosaurs from the Western Interior Seaway through the extinction event in the K-Pg boundary of the Hell Creek Formation, Ice Age hunting techniques of paleoindian tribes, and homesteading in the West. Our exhibits include fully mounted skeletons of Anatotian copei and T. rex, a complete skull of Triceratops, mounts and casts of pachycephalosaurus, mosasaur, and a pterosaur as well as displays on the enduring cultures of American Indian nations in the area, natural history, ranching, rodeo, and the story of life on the Plains.

The taxidermy exhibit is also very dynamic. Ms. Hall reimagined the current exhibit and has more creative ideas in mind for the future.

The areas in need of revitalization are the Vets Room, The School House, and the Cabin. The mannequins are old, and the objects don’t appear to tell any specific story. The textiles should be rotated off view and off the mannequins. The exhibits in the Vets Room are not well curated and the exhibits are dirty. Textiles should be rotated out of the light and off the mannequins.
There are CCM collections in the School House. This space is open for visitation with a barrier dividing the visitor from the collection. The space is also used for presentations and workshops. The School House is closed in winter and cleaned in the spring before opening. The collections are at risk due to lack of environmental, light, and visitor controls. The mannequin is tired.
There are CCM collections in the Cabin. This space is open for visitation with a barrier dividing the visitor from the collection. The Cabin is closed in winter and cleaned in the spring before opening. The collections are at risk due to lack of environmental, light, and visitor controls. The mannequins are tired.
STORAGE

Although storage areas are clean and organized, they suffer from lack of tight environmental controls, locations in mixed use spaces, and poor storage furniture.

MUSEUM BUILDING

This space is the only space that can be used to dry out wet collections coming into the building. Collections storage is located in this “drying” space.
Collections housed in old shelving units in the “wet” room.
Storage area behind offices
Safe in offices

Storage of collections, including photographs under the exhibit cases in the Vets Room. These storage cabinets are not locked.
Attic

Two saddles stored in clean attic

The Museum Tower

storing a loom
Storage Building One is a large space with a mix of collections storage, institutional storage, and dirty activities. Paleo collections are processed in this area. This activity is dirty. The collections and the people working in this area are not protected from the dirt. The large door is often open. There is a lack of environmental control and ventilation. The building is locked and checked weekly.

Below, Director Sabre Moore demonstrates the use of the glove box used by Paleo interns. In practice, Paleo interns wear protective clothing including gloves, aprons and ventilation masks when working on fossil collections.
Examples of collection storage in Storage Building One
NEW STORAGE BUILDING TWO

This is a new build for collection storage. It is clean and still fairly empty.

1945 jeep
The assortment of collections in New Storage Building Three
STORAGE BUILDING THREE- Geology Specimens, Vehicles, misc.

This is a fairly dirty space with no climate control. The building is locked and checked weekly.
THE BUILDINGS

REVIEW OF EXISTING CONDITIONS:

The Carter County Museum consists of the primary museum building on Main Street, along with a one-room school house and log cabin which have been moved onto the site.
On County property, the Museum has three warehouse structures a short distance away on Highway 323.

The newest building to the right is the Cultural Collections Storage building. Having been recently constructed, only a limited number of artifacts are currently in this storage facility.

The Paleontological Collections Storage building is pictured below.

There is ample space for processing the fossils as they are brought in from the digs.

The small building to the right (not listed in the questionnaire) is unconditioned and has only a dirt floor. It houses some carpentry materials, a fire engine, an old tractor, and only a few other metal objects. There are no accessioned objects currently stored in this structure.
THE MAIN MUSEUM BUILDING:
The arrangement of spaces within the Museum is illustrated in the floor plan below.

The building was originally constructed with an arched roof and a symmetrical front façade. The addition is easily identified by the dashed red lines added to the floor plan and the image to the right.

The stone façade facing Main Street is attractive with what appears to be a pair of doors in its center flanked by two large recesses. The recess to the right includes one of the required emergency exits. Ordinarily, one would expect the main entrance to the museum to be on the front façade. In this case, the addition’s tower is an ample landmark to draw patrons around to the side where the actual front door exists.
The addition, the tower and the decorative use of petrified wood as masonry, both inside and out, were completed between 1975 and 1982 during the tenure of former Director Marshall Lambert (CCM Director 1946 to 1996). It’s been reported that much, if not all, of the masonry works was done by Director Lambert personally.

While on site, there was discussion whether there is a desire to have the Museum listed on the National Register of Historic Place. The staff generally feels it is deserving. However, given the dates of the addition and the fact that the addition contributes significantly to the structure, I doubt that the State Historic Preservation Office of Montana will look favorably upon a nomination until 2032. Whether listed or not, the Museum’s history is significant, especially in conjunction with Marshall Lambert’s fifty years of service as its director!

The structure is primarily masonry exterior walls with bowstring wood trusses supporting the roof. This allows for clear-span, column free, areas throughout the original structure. The ceiling over the Cultural Exhibit Hall is flat whereas the ceiling over the Natural History Hall follows the curve of the roof with the trusses enclosed. This approach has allowed greater height for the dinosaur exhibits.
Generally, the exterior masonry is in good shape. The dark staining on the masonry over this front lintel is due to excessive moisture. Rain or snow remains on the lintel longer than the surrounding surface. The excess moisture support lichen growth which is the dark color seen here. It can be removed by killing the lichen with diluted bleach, then brushing it away with a stiff bristled brush. However, lichen is airborne and will return in a relatively short period of time. Even a long-term solution such as installing a metal drip flashing over the lintel may not permanently prevent the lichen from forming.

The yellow substance is another form of lichen that exists on the sill. The stone is cracked and repairs have previously been attempted. Because lichen is growing within the crack, it is unlikely that future repairs will be successful, unless this portion of the
structure is disassembled. If disassembly is planned, it will be more cost effective and a longer lasting solution to simply replace the stone.

The masonry has been maintained on a regular basis using readily available materials such as premixed mortar compounds. These materials have high percentages of Portland cement with little or no lime. Portland cement is strong, very rigid and brittle if applied too thin. In some cases, it is stronger than the stone and is causing the stone to spawl as can be seen in the upper image. In the case above, now moisture can collect in this pocket which will increase the rate of deterioration.

In the image to the right, the Portland cement mortar which is known to shrink, has developed a vertical crack in the repaired joint.

The image to the left provides examples of mortar placed too thin. The upper example has already fallen out, and the lower example is about to fall.

The crack through the stone and the mortar joint is not shrinkage, but rather a movement joint. All buildings move due to thermal expansion and contraction. In older buildings with lime-rich mortar joints, the joints absorb the movement. In modern building, architects design expansion joints to allow for the movement. This building has had the modern mortars used for repairs and the masonry can no longer absorb the thermal expansion and contraction.

To avoid these issues, the repointing mortar must match the original mortar, or be less strong and more flexible. A mortar analysis should be done to determine the formula of the original mortar then new replacement mortar should match that formula.
The example to the right is actually from the interior of the building. It illustrates an ideal mortar joint which is recessed at the top and allowed to extend out to the face of the stone below.

There is some excess mortar on the lower stone, but it is minimal.

The image also shows that a chinking stone was added where the joint between the courses of stone was excessively wide.

The mortar in the vertical joints are brought flush with the stones on either side of the joint.

The image to the right is of the interior wall in the office area. It is an excellent example of appropriate mortar joints in a stone rubble wall.

Since CCM has an individual willing and capable of maintaining the masonry, these examples should provide sufficient guidance so that the work will be accomplished in the most durable manner.
The roof of the museum, which could be observed, appears to be in good condition. No leaks were reported and while the exact date of the roof’s installation was not readily available, it is generally expected to have been about 15 years ago.

Since a new addition is being contemplated, I recommend that the existing roof be replaced as part of that project since it will be necessary to tie into the roof as part of that project.

There are a few areas related to the roof which should receive attention. The soffit in the image to the right needs to be reattached and it should also be painted.

To the left is another area on the museum building where the paint has worn away. Below is one of the window sills of the school house which is on site. It also has small areas with deteriorated paint.

These areas need to be protected with fresh paint. Perhaps they could be consolidated into a weekend project for volunteers as part of a spring clean-up event.
Upon entering the museum, you are immediately greeted by the receptionist at the front desk. A guest registration monitor is located to the left, the gift shop to the right and the Cultural History Hall is just beyond the reception desk. Generally, the public spaces are inviting and patrons follow a logic pathway through the museum.

Lighting throughout the museum, including the exhibit spaces, gift shop, work spaces, restrooms and storage areas are fluorescent or incandescent. The availability of replacement parts for the fluorescent fixtures has become problematic. Switching out those fixtures is virtually a necessity.

I recommend that a lighting designer with experience, which includes exhibit lighting, be consulted. Proper light levels are essential. A light fixture replacement project is also an opportunity to utilize lights operated by motion detectors which could help save on the electric bills. Lights operated by motion detectors, if carefully orchestrated, can help direct patrons through the exhibit spaces and direct their attention to aspects of the exhibits which they might not otherwise observe. While a lighting project could be postponed to be included with the construction of the addition, I recommend that you do not wait, rather seek grant funding for this worthwhile improvement.
The Carter County Museum is very well maintained; however, there are a few spaces behind the scenes which could be improved. For instance, pictured to the right is the mechanical room which is the location for the fire suppression system’s entrance. While storage of some maintenance items is appropriate, having boxes of material located in the pathway to the equipment should be avoided.

Without question there is a need for tools, equipment and supplies. However, keeping aisle spaces open is essential for staff safety. Undoubtedly, this issue will resolve itself with the construction of the addition.
The onsite climate-controlled storage space is located at the rear of the museum. As is often the case when modifying an existing structure, ideal locations are not available. It is not ideal to have a garage door, from the exterior, in a climate-controlled space. With the coming addition, this issue will also be resolved. However, having garage door access to the museum can be an asset. So, when planning the addition, the future function of this space needs to be carefully considered.

Food preparation space in a museum facility is inevitable, both for staff and for patron functions. The current location is convenient for patron functions. However, separating the food preparation space from the museum with only a curtain does little to prevent pests from migrating out of the area and wandering into the rest of the museum. Again, this issue needs to be a priority when designing the addition.
There are two locations in the museum with attic spaces. A drop-down stair provides access to the space available above the ceiling over the Cultural Exhibits Hall. A similar stair is located in the Military Exhibits space for access to a space within the tower.

Above the Cultural Exhibits Hall, a floor has been created to provide for storage of some objects. Spray on insulation has been installed against the underside of the roof greatly reducing energy cost for heating and cooling the museum.

One of the wood trusses seen in the background has been cutout to facilitate installation of the fire sprinkler system. This weakens the truss and it will not preform to its designed capacity. There are several ways to correct this problem from relocating the fire sprinkler line so that the members can be replaced in total, to leaving the pipe in place by having a structural engineer design a gusset to surround it. While this is the only location where I noticed cuts in the trusses, all of the trusses need to be examined and corrected where truss members have been cut.
Attic space above the Military Exhibits area is more generous especially with headroom. However, the difficult access makes it a less than desirable location to store objects.

Neither space is ideal for storing objects and the objects should be moved to a more accessible space, with climate control.
The museum has a good heating system utilizing ceiling hung units in all spaces. Two are shown in the image below.

The units above appear to be Chromalox LUH-D-10-83-34-00 Electric Fan Forced Horizontal Blower Unit Heaters. They appear to be more recent than the unit heater shown below. This Reznor heater appears to be significantly older than the Chromalox heaters. It is also gas-fired rather than electric. It seems likely that the Reznor units were existing in the building when it was acquired for the museum.

Since there were no reported problems with these heaters, replacement may not be necessary for many years. However, since the addition is being planned, I recommend that replacement of these heaters be incorporated in the addition’s design. Removal of the gas fired units will improve safety relative to fire danger. Removal of all of the units will enhance the overall appearance of the museum. More importantly, if the addition is designed with a central heating and air conditioning plant, the conditioned air could be delivered to nearly all locations within the building via the existing attic.
SCHOOL & LOG CABIN:

The two buildings located on site with the museum, the school house and log cabin do not have climate control. The school is utilized during the summer for various activities and perhaps the addition of year-round climate control should be considered. The log cabin which is for display only, does have electricity. The objects housed within both structures are not considered to be irreplaceable.

Ongoing maintenance is essential. As mentioned earlier in this report, keeping paint on the wooden features exposed to the weather is important. Including an annual review and touch up painting is a simple way to stay ahead of this issue.
There is wiring in the log cabin which was very discretely installed. It appears to be abandoned at this time. Even if it is abandoned, the cover plates for junction boxes should be reinstalled and kept in place.

There are two “non-historic” staples located over the front door to the cabin. I’m probably the only one who will ever notice, but since they don’t seem to have a function, I recommend they be removed.
CULTURAL COLLECTIONS STORAGE:

The newest structure, pictured above was recently completed and is in the very beginning stages of being organized for the cultural collections storage. The building is insulated, but unheated at this time.
PALEONTOLOGICAL COLLECTIONS STORAGE

This building was originally constructed for other Carter County purposes. Just inside the garage door is an open receiving space which accounts for approximately half of the available floor space of the structure.

It is in this space that objects brought in from the digs are first processed.
The facility is heated but no air conditioning is available. Several large tables are available with ample space around them for staff and volunteers to work.

Compressed air is used during the processing of the objects and the equipment is housed adjacent to the work spaces. Portable fans as well as a built-in exhaust fans are available to mitigate airborne dust not captured by the vacuum system shown above. The building serves this purpose well, although there are some issues to be addressed.

There is evidence of previous roof leaks and an abandoned flue for a ceiling mounted heater. Removing the flue and repairing the ceiling should be scheduled as funds become available. Wherever ceilings are damaged by water the insulation above the ceiling needs to be inspected. When insulation is wet, it is ineffective and more energy is necessary to heat the buildings.
The remainder of the building has not been altered and while there is heated space for storage, the configuration is not ideal. Several objects are stored on high shelves and aisle spaces are small.

Other spaces within the facility have had moisture damage and should be repaired when the ceiling work is undertaken.

There is an excessive amount of light leaking in around the walk-in door which may also be an avenue for rodents or other undesirable pests to enter the building.
PRIORITIES FOR THE STRUCTURES

There are a number of recommendations which may become part of the new addition project. The immediate priorities should not wait for that event, but should be undertaken as soon as funds are available. Short-term recommendations may be included with the construction of the addition or may be undertaken ahead of that construction. Long-term recommendations assume the addition will have been completed before these recommendations are addressed. These recommendations should be accomplished even if construction of the addition is indefinitely postponed or abandoned altogether.

IMMEDIATE PRIORITIES:
- Survey all structures and clear the pathways at all required emergency exits.
- Survey all existing roof trusses throughout the main museum building and repair/correct all damaged truss members,
- Replace the curtain between the food preparation area and the museum with a better solution to prevent inviting pests into the museum from the kitchen
- Complete touch up painting and minor repairs to wooden components on the exterior of all structures,
- Remove objects from inaccessible attic spaces in the main museum building,
- Weatherstrip doors and eliminate pest access at all structures.

SHORT TERM PRIORITIES:
- Retain a lighting designer for all spaces throughout the main museum building. Incorporate efficient fixtures and motion detectors to optimize the patron’s experience with exhibits,
- Redesign existing HVAC system to provide better air circulation and distribution throughout the main museum building,
- Close abandoned furnace flue, repair ceiling and other water damage in the Paleontological Collections Storage building,
- Collect mortar samples of original mortar at the main museum building and have it analyzed at a laboratory which regularly provides such analysis. Provide best practices training for maintenance staff who have been making these repairs in the past,
- Remove lichen and make masonry repairs

LONG TERM PRIORITIES:
- Install year-round climate control in all spaces at the Paleontological Collections Storage building.
- List the original museum building on the National Register of Historic Places.
RECOMMENDATIONS
ACTION ITEMS

These recommendations are brief outlines of the recommendations made throughout the main body of the assessment report. They are organized here along a suggested timeline.

This report recommends that the Carter County Museum carries on with its excellent programs, increasing professionalism, and community support.

Short-Term Recommendations:
(Over the next year)

- New Strategic Plan that includes planned initiatives including the new museum
- Upgrade the microscope used in the amber project
- Place dataloggers in the areas containing collections. These dataloggers should be connected to a program used to store and compare data.
- Purchase a light meter to monitor light levels in collection spaces
- Upgrade security camera system, replacing broken cameras
- Purchase a professional 3D scanner such as the Artec Leo, Artec 3D
- Install some form of security in the ultraviolet room. This could be as simple as a motion alarm.
- The areas in need of revitalization are the Vets Room, The School House, and the Cabin. The mannequins are old, and the objects don’t appear to tell any specific story. The textiles should be rotated off view and off the mannequins. The exhibits in the Vets Room are not well curated and the exhibits are dirty. Textiles should be rotated out of the light and off the mannequins.

Intermediate-Term Recommendations:
(Within the next 2 years)

- Fundraising for the new museum. The new museum would alleviate issues listed below.
  - The need to provide an exhibition space worthy of the internationally renowned Paleontology collection
  - The need for safe and purpose-built workspace for old paleo collections and incoming, wet paleo finds
    - The need for a “dirty” room away from collections storage
    - The need for an extraction system large enough to work on large fossils
  - The need for museum quality storage furniture and materials for paleo collections
  - The need for work and office space for staff, seasonal and part-time staff, fellows, and interns, and volunteers
- Plan for moving, tracking, and installing the Paleontology collections in the new building
- Plan for moving, tracking, and installing the Non-Paleontology collections within the current building
Long-Term Recommendations:
(Within the next 5 years)

- Prepare the collections for the move of Paleontology to the new building
- Prepare the Non-Paleontology collections for the move within the current building
  - Adapt space in the current building for exhibition and storage of Non-Paleontology collections
- Hire staff for the collection moves
- Prepare the new building for collections coming into new exhibitions and storage
  - New exhibition mounts, didactics, graphics, etc.
  - Prepare new storage cabinetry with materials such as Ethafoam, etc.
- Move and track the collections

CONCLUSION

The Carter County Museum is being rocketed out of isolation. In spite of its physical location at the intersection of two lonely, yet beautiful Montana highways, The Carter County Museum has reached international status as a world class museum. The action being taken to professionalize the museum and build an addition fitting the collection and activities will ensure the Carter County Museum’s place amongst the most stellar museums. We highly recommend that the many communities involved continue with their deep support of the amazing Carter County Museum.